

Children with brain lesions able to use gestures important to language learning

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Children with brain lesions suffered before or around the time of birth are able to use gestures – an important aspect of the language learning process – to convey simple sentences, a Georgia State University researcher has found.

Heyda Özçalkan, assistant professor of psychology, and fellow researchers at the University of Chicago, looked at [children](#) who suffered lesions to one side of the brain to see whether they used gestures similar to typically developing children. She examined gestures such as pointing to a cookie while saying "eat" to convey the meaning "eat cookie," several months before expressing such [sentences](#) exclusively in speech.

"We do know that children with brain injuries show an amazing amount of plasticity (the ability to change) for language learning if they acquire lesions early in life," Özçalkan said. "However, we did not know whether this plasticity was characterized by the same developmental trajectory shown for typically developing children, with gesture leading the way into speech. We looked at the onset of different sentence constructions in children with early brain injuries, and wanted to find out if we could see precursors of different sentence types in gesture.

"For children with brain injuries, we found that this pattern holds, similar to typically developing children," she said. "Children with unilateral brain injuries produce different kinds of simple sentences several months later than typically developing children. More important, the delays we observe in producing different sentences in speech are preceded by a similar delay in producing the same sentences in gesture-speech combinations."

Children with brain injuries also had a more difficult time in producing complex sentences across gesture and speech, such as conveying relationships between actions, for example saying "help me do it" while making a painting gesture.

"This in turn was later reflected in a much narrower range of complex sentence types expressed in their speech," Özçalkan said. "This suggested to us, in general, that producing sentences across gesture and speech may serve as an embodied sensorimotor experience, that might help children take the next developmental step in producing these sentences in speech.

"And if you bypass the gesture-speech combination stage, that might negatively affect developing a broader representation of complex sentence types in speech."

The researchers also compared children with smaller [brain lesions](#) against children with large lesions, and found more of a delay in producing sentences, both in speech and in gesture-speech combinations, in children with large lesions.

The research has implications for developing interventions to help children with the language learning process, "as it shows that [gestures](#) are integral to the process of [language learning](#) even when that learning is taking place in an injured brain," Özçalkan said.

"When children do different kinds of sentence combinations across gesture and speech, that's like a signal to the caregiver that 'I'm ready for this,'" she said. "The caregiver can then provide relevant input to the child, and that could in turn help the child take the next developmental step in producing that sentence entirely in [speech](#)."

More information: The research, "Gesturing with an injured brain: How gesture helps children with early brain injury learn linguistic connections," was published in the *Journal of Child Language*. journals.cambridge.org/abstract_S0305000912000220

Provided by Georgia State University

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